

Claims

1. A process for the production of a valuable compound, comprising the steps of:

- * fermentation of a microbial strain on an industrial scale in a fermentation medium which is a chemically defined medium essentially composed of chemically defined constituents, and
- * recovery of the valuable compound from the fermentation broth.

2. The process of claim 1, wherein the chemically defined medium contains an essentially small amount of a complex carbon and/or nitrogen source.

3. The process of claim 1 or 2, wherein the chemically defined constituents of the chemically defined medium comprise a carbon source selected from the group consisting of carbohydrates such as glucose, lactose, fructose, sucrose, maltodextrins, starch and inulin, glycerol, vegetable oils, hydrocarbons, alcohols such as methanol and ethanol, organic acids such as acetate and higher alkanolic acids, and a nitrogen source selected from the group consisting of urea, ammonia, nitrate, ammonium salts such as ammonium sulphate, ammonium phosphate and ammonium nitrate, and amino acids such as glutamate and lysine.

4. The process of claim 3, wherein the carbon source is glucose and the nitrogen source is ammonia and/or an ammonium salt.

5. The process of any one of the claims 1 to 4, wherein fermentation occurs via a batch, a repeated batch, a fed-batch, a repeated fed-batch or a continuous fermentation process.

6. The process of claim 5, wherein fermentation occurs via a fed-batch process.

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7. The process of claim 6, wherein a carbon and/or a nitrogen source is fed to the process.

8. The process of claim 7, wherein the carbon source is glucose and the nitrogen source is ammonia and/or an ammonium salt.

9. The process of any one of the claims 1 to 8, wherein the valuable compound is a pharmaceutical protein or peptide, a primary or a secondary metabolite, or an industrial enzyme.

10. The process of claim 9, wherein the valuable compound is a secondary metabolite.

11. The process of claim 10, wherein the secondary metabolite is a β -lactam compound.

12. The process of claim 9, wherein the valuable compound is an enzyme.

13. The process of any one of the claims 1 to 9, wherein the microbial strain is a yeast.

14. The process of claim 13, wherein the yeast is *Phaffia rhodozyma* and the valuable compound is astaxanthin.

15. The process of any one of the claims 1 to 9, wherein the microbial strain is a filamentous microbial strain.

16. The process of claim 15, wherein the filamentous strain is a fungus.

17. The process of claim 16, wherein the fungus is an *Aspergillus* strain.

18. The process of claim 17, wherein the fungus is *Aspergillus terreus* and the valuable compound is lovastatin.

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19. The process of claim 16, wherein the fungus is a *Penicillium* strain.

20. The process of claim 19, wherein the fungus is *Penicillium chrysogenum* and the valuable compound is a β -lactam compound.

21. The process of claim 16, wherein the fungus is a *Mucorales* strain.

22. The process of claim 21, wherein the *Mucorales* strain is a *Mortierella* strain.

23. The process of claim 22, wherein the *Mucorales* strain is *Mortierella alpina* and the valuable compound is a lipid comprising arachidonic acid.

24. The process of claim 23, wherein the lipid comprising arachidonic acid is a triglyceride.

25. The process of claim 21, wherein the *Mucorales* strain is a *Blakeslea* strain.

26. The process of claim 25, wherein the *Mucorales* strain is *Blakeslea trispora* and the valuable compound is β -carotene.

27. The process of claim 15, wherein the filamentous strain is a bacterium.

28. The process of claim 27, wherein the bacterium is an *Actinomycete*.

29. The process of claim 28, wherein the *Actinomycete* is a *Streptomyces* strain and the valuable compound is glucose isomerase.

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30. The process of claim 28, wherein the Actinomycete is *Streptomyces clavuligerus* and the valuable product is clavulanic acid.

31. The process of claim 28, wherein the Actinomycete is *Saccharopolyspora erythraea* and the valuable compound is erythromycin.

32. A method for preparing and/or improving a microbial strain producing a valuable compound of interest which is capable of being fermented on an industrial scale in a chemically defined medium, comprising the steps of:

- * subjecting a suitable parent strain to a mutagenic treatment selected from the group of physical means and chemical mutagens, and/or to DNA transformation,
- * screening the resulting mutants and/or transformants for their growth performance on a chemically defined medium and their production level of said valuable compound of interest,
- * selecting mutants and/or transformants which have a good growth performance on a chemically defined medium and/or an improved production level of said valuable compound of interest as compared to said parent strain.

33. The method of claim 32, wherein the parent strain is selected from the group consisting of strains which have a good growth performance on a chemically defined medium, but which need to be improved on production level.

34. The method of claim 32, wherein the parent strain is selected from the group consisting of strains which have a high production level of a desired compound but a relatively bad growth performance on a chemically defined medium.

35. Use of a chemically defined fermentation medium for the production of a valuable compound by fermentation of a microbial strain on an industrial scale.

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